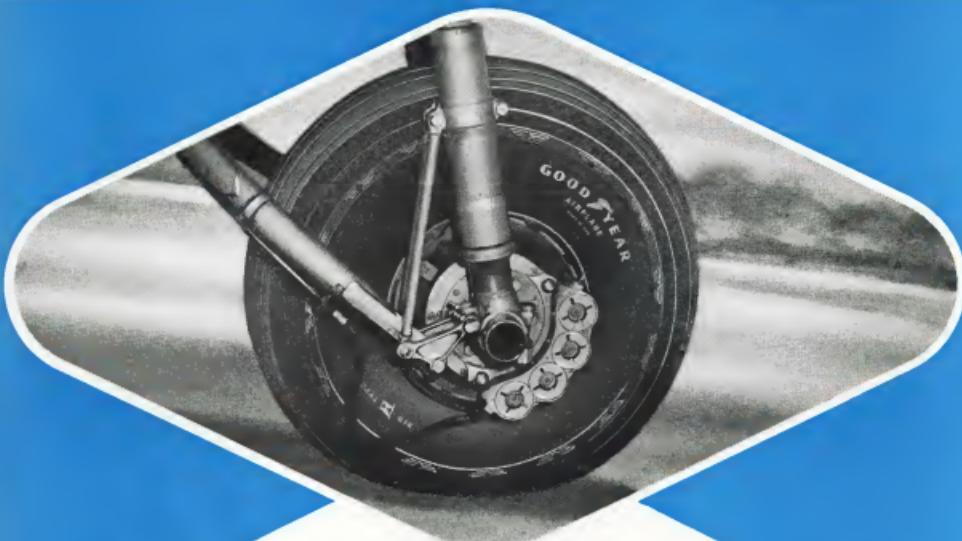


# AVIATION WEEK

A McGRAW-HILL PUBLICATION

DEC. 13, 1948



## Now a lighter, stronger brake for DC-3's

Goodyear announces a new brake for DC-3's—the Dual Disc Brake. It's more than 75 pounds lighter per plane and is rated at 2,000,000 foot-pounds of kinetic energy. The Dual Disc Brake has the same self-aligning mechanism as the famous Goodyear Single Disc Brake, permits visual check of

lining wear before each flight. Delta is one of the airlines which has already changed over completely to Dual Disc. Inquire about installing this new lighter, stronger brake on your DC-3's. Write: Goodyear Aviation Products Division, Akron 16, Ohio or Los Angeles 54, California.



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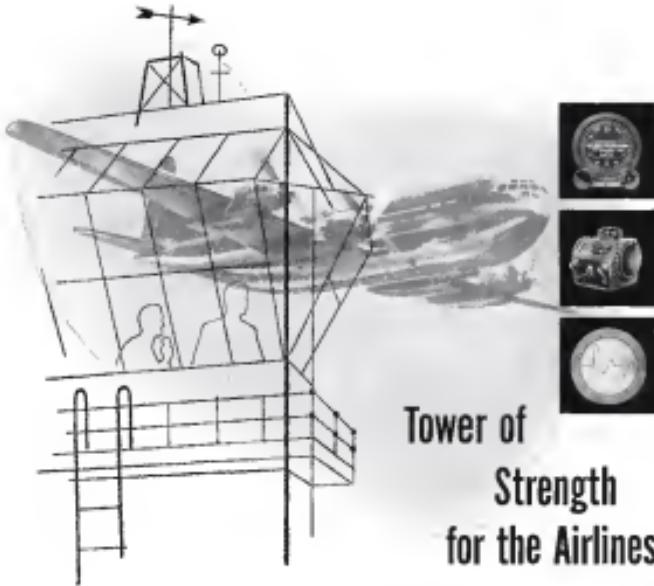
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PHOTOGRAPH BY C. C. STONE



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AVIATION WEEK, December 23, 1948



# THE AVIATION WEEK

## Aviation and Foreign Aid

Several foreign aviation agencies are now in the United States viewing our work. Western Europe desperately needs a swift build up of its defense air power. From these visits some observers have concluded that a new flood of foreign orders reminiscent of 1939-40 are in the offing. There are a number of reasons why such a rapid turn of aviation history should not be anticipated.

The aviation industry has the capacity to handle a greatly increased export demand and it certainly would welcome any new business. However, straight export sales of military types to western European nations are not in prospect. The reason is simple. In 1939-40 Europe was going broke. In 1948 Europe is broke. The western European nations are now dependent on the United States for sufficient food to keep alive. Their dollar-laden treasure cannot finance the slow new jet fighters they want to prevent a repetition of the paralyzing air assault from the east they suffered in 1940.

### Lead-Lag Hope

The only hope of getting enough defensive air armament soon enough seems to be in a new lead-lag type program in which the United States will agree to underwrite at least part of their military commitment. It is certain that some form of military aid program for western Europe will be presented to the UN Congress next year. There seems little chance that aviation will have large in which program finds its way to Congress.

To understand why U.S. aviation will probably play a minor initial role in the opening phase of a military aid program for Europe it is necessary to go back to the origin of the North Atlantic Defense Pact not under discussion by U.S. government top policy groups. Preliminary discussions on the Marshall Plan early this year indicated that economic rehabilitation would not be possible without a corresponding agreement on mutual defense.

### Want Defense Pact

Until a robust pact was forthcoming all countries was willing to depend on its neighbor for vital war industry or strategic raw materials. The western European nations looked to the United States for some definite indication that we would back up our commitment with something more than a word of emerges and that in an event we would not pull out of Europe if and when the cold war warmed up. That assurance was given in the little noted resolution sponsored by Senator Vandenberg that slipped through the Senate by a 66-4 vote last spring. It stated that the United States looked with favor on formation of a North Atlantic Regional Defense Pact. The earlier hemispheric defense pact at Rio was the precedent for this action. The Berlin air raid offered further proof that

we intended to do in Europe. Then with the nod from the United States the Benelux nations (Belgium, Luxembourg and Holland) plus France and Great Britain joined in the Brussels defense pact and organized an international general staff to conduct joint defense planning for the western European union. United States officers have been visiting in on these joint defense planning sessions in anticipation of the pact's enlargement to include the United States and Canada. Initial planning established the general roles of each nation in the common defense plan with the continental territories charged primarily with providing ground forces and Britain tagged to provide defense in power. The United States role was tentatively assigned as guardian of the massive power to back up European ground and air if conflict threatens.

### Requirements Drawn

Planning has now reached the stage where specific requirements are being drawn up to fit western European needs. Here, as in the original ECA planning, there will be a wide gap between what Europe wants and what the United States can give. Postage planes will be too expensive for the initial European military and largely out of war surplus stocks. This would be satisfactory for the ground forces but less so for the air. The Europeans want jet fighters to defend their population centers against aerial air blitz. The U.S. Air Force, already committed to its own expansion has a post war low, has no jets to spare and would like to export part of its stock of surplus piston engine fighters.

At present Britain is supplying western Europe and Scandinavia with jet fighters of her second best type - the Vampire. But a full scale capturing of the western European market with jet fighters would tax British production facilities beyond their present limits.

Contenders of what the military aid program will add to the war national defense budget range around a billion dollars a year. But half of that will be war surplus equipment for European ground troops. If these are any air equipment involved it will be the Republic Mustangs and Thunderbolts - not jet Shooters, Sabres and Thunderjets. Some observers feel that the piston fighters will be useful for a few more years in Europe since there is no real indication of large German and/or Italian German jet plane production and the bulk of the Royal Air Force is still World War II types.

So the U.S. aircraft industry can expect no strong stimulus from whatever aid plan goes to Europe in the near future. It will continue to depend almost entirely on the military production required by the expansion of the U.S. Air Force and the Naval air service for its existence. Western Europe will continue to arm largely with British Vampires and later Mustangs. Only a sudden darkening of the European skies would naturally alter that current planning.

AVIATION WEEK, December 18, 1948

THE AVIATION WEEK

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REVIEWERS: **James B. Holt**, *Harvard Law School*; **Frederick  
R. Goff**, *University of Michigan Law School*; **Philip L. Heyer**,  
*University of Michigan Law School*

## AVIATION CALENDAR

#### PICTURE CREDITS

ACTS—15 IT PREVIOUS BILL Allocated—  
15 (497) FEDERAL CONTRACTS—12, GSA—13  
COMMERCIAL AIRPORTS—11, HASC & Energy—  
16, EPA—13 GRAND TOTAL—15 IT PRE-  
VIOUS ACTS—17 (applies to 15) AND IN-  
CLUDING 15 (497) AND 15 (498) GSA—13  
IT TOTAL—18. While PREVIOUS—14



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END. REPORT OF THE COMMISSION ON AVIATION ACCIDENTS TO ROAD TRAFFIC COLLISIONS IN 1978

AVIATION WEEK December 11, 1961



## ANNOUNCING THE NEW *Turbo-Cyclone 18 COMPOUND ENGINE*

longer range, increased payload, greater economy and higher power output are provided by this latest Wright-Aeronautical Corporation development.

The Turbo-Cyclone 18 combines the dependable performance of the reciprocating engine with the simplicity and compactness of the gas turbine. It will use a sizable portion of the energy in the exhaust gases of a reciprocating engine to drive three turbines that are geared back to the engine crankshaft.

To the operator the Turbo-Cyclone 18 offers a choice of (1) a reduction in specific fuel consumption of as much as 25% (2) a 25% increase in range or the same amount of fuel (3) a substan-

tial increase in payload because of the reduced fuel consumption, or (4) a 25% increase in power for the same amount of fuel. Additional features include:

- lower specific weight — less than one pound per horsepower developed
- ease of installation in existing aircraft — fit within and below existing nacelle
- ease of maintenance — no additional cylinders — readily removable nacelle units — ease of operation
- no additional controls — no specialized training of flight crews
- The production of the Turbo-Cyclone 18 fulfills today's requirements for optimum economy and performance in long range aircraft.



POWER FOR AIR PROGRESS

Aeronautical Corporation  
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# WRIGHT

## NEWS DIGEST

### DOMESTIC

American Orleans Airlines rate to Pan American Airways reportedly is under discussion. At subways, neither carrier would comment. New York financial circles state that PAA would consider overhauling several aircraft and that American Airlines commented with a diffused proposal.

Contract aircraft shipments in September totalled 380, valued at \$5,454,937. Contract aircraft reported. Value of aircraft, parts and other products was \$1,506,979. Contract aircraft reported. Total aircraft (with parts and other products) at \$4,958,930. No data on military aircraft were given. Aviation results disclosed for first four air report for September, were: 700 aircraft, valued at \$9,369,566, with value of plane parts and other products at \$1,756,872; 660 aircraft (with parts and other products) valued at \$3,549,191.

Boeing Airplane Co. reflected the first B-47 Strategic bomber housing to the Air Force and announced receipt of let by the Air Force for two B-47s.

Consolidated Vultee Aircraft Corp. received CAA approval for the streamlining section Control Line.

National Airlines used CAA approval to start coach service between Washington and the Twin Cities via Pittsburgh, Cleveland, Detroit and Milwaukee. Rate would be approximately 4 cents a mile.

### FINANCIAL

Bell Aircraft Corp. reported net loss of \$412,311 for nine months ending Sept. 30, a sum of \$89,907,545. For the period Jan. 1 to June 30, loss was \$181,161 on sales of \$18,645,705.

Nortronics Corp. reported net profit of \$1,117,777, about four times profit of first half of 1945, compared to \$16,500 net profit for like period last year. Booklet is \$75 million.

Continental Aircraft Engineering Corp. declared dividend of \$2 per share of common stock payable Dec. 21 to holders of record Dec. 11.

Beech Aircraft Corp. declared regular 50 cent quarterly dividend and \$3 cent special year-end dividend payable Dec. 29 to holders of record Dec. 10.

### FOREIGN

International Air Transport Association, through IATA's clearing house in London, set a new monthly total of \$15,100,000 in September, exceeding by \$2,644,000 the August total which also was a record. During September, trans-Atlantic totals \$84 million, compared to \$57 million in same period of 1945.

## INDUSTRY OBSERVER

U. S. Air Force and Bell Aircraft Co. are studying the application of turboprop and supersonic aircraft plane in an effort to increase its speed and duration. Bell has tested supersonic engines on the XF-84 twin-jet fighter. The XF-84 has been lengthened, slow-speed and unsupersonic. It has been demonstrated unsupersonic at supersonic speed, approximately on at least one occasion, when the power was at 90% max. Flight is now being made only at the 50-55,000 ft. level because of the ungrounded cockpit. This is well below the 59,000 ft. altitude record held by the British D.H. Vampire. In passing through the transonic zone, the elevator becomes a shock-wave screen for a brief period, except as predicted by wind tunnel tests.

Naval Air Material Center, Philadelphia, is building a strength fleet of titanium, the new wonder metal slated for extreme aviation use. The fleet will be tested for comparison with aluminum, steel, magnesium and other metals on which data have been obtained.

Final official record of deHavilland DH 108 sonic dive performance to Mach number 1.04, representing a speed of 684.65 mph, at 18,332 ft. Mach number and speed rapidly diminished as the supersonic research phase began in a path of shock waves.

Panavia XP11 is now undergoing flight tests at Naval Air Test Center, Patuxent, Md. It is a five in place really design following the long range's fast but lessening developing blades to permit outer-disk elevator use.

Prototypes of two new jet engines, each developing 6,900 lb. thrust are being tested in Sweden. Both of all-Swedish design, one is an axial-flow type built by Svensk Aeronaut Enginer Co. and the other a centrifugal compressor developed by Stal Enginer Co. Svensk Aeronaut Enginer Co. is performing the British-designed Goblin engine under license from deHavilland.

Swedes had orders for 16 Sessulans from AB Aer. with other contracts in sight. The Swedish manufacturer, however, has not been building sales too strongly. It doesn't want to build up a large backlog and a consequent heavy inventory of material when delivery dates would have to be several years away. Because of this cautious approach the company continues its development work on the Sessulans at around \$7 million.

Since the British Tudor joins British Overseas Airways Corp. as being permitted to fly much more important role in specifications and designs for future British transports, The Tudor, and several other British transport designs were designed under supervision of the Ministry of Supply, and British as far as possible considered.

North American is putting 22 more seaplane AT-6 trainers through over-haul in Venezuela and three for the Philippine Air Force. A short ago Argentine Navy ordered 30, and 45 were ordered by Sase for Army and Navy.

For Curtis L. Davis, Inletted Verville engine aerojet, is driving wide interest in the United States. Scandinavian model has been delivered to CAA for trials. Larger experimental model, to be designated as C-75. Midsize model has been designed to use the nozzle of model aircraft engines and orders for 10,000 units are in prospect. The Stratos aircraft has purchased the aerojet to suffice the future-supersonic market in these planes. Production will be on a one-time basis to assist Davis, at Douglas (Gold) Airport. He is discussing with manufacturers for mass production.

Mid-February, now is the target date for first use of the Los Angeles Airport FIDO installation. Originally the hawks were to be flushed off the hill. Difficulty in obtaining aviation equipment forced delay of inauguration.







Legend Wright plane, being transported by Carrie, Paul, Gieber, will have the place of honor in the Air Museum of the Smithsonian Institution—which once rejected it.

## Wright Plane Back Home at Last

Craft completes its 45-year journey from Dayton to Museums in Washington via Kitty Hawk and London.

By Alexander McSorley

A travel-worn and venerable airplane whose evocative faint rotted leather on a total flight performance of less than two minutes doubtless in a single day nearly half-century ago, assumes final flight of its life when it goes to the Smithsonian Museum in Washington.

At 10 a.m. on Dec. 17, the 45th anniversary of the Wright Brothers' first power plane flight of Kitty Hawk, N.C. in 1903, the mummified "Flyer" will be unveiled. The enthusiasts will be addressed by President Truman, representatives of many foreign nations, and relatives of the Wright Brothers, who will make the presentation of the craft to the Museum.

The plane will be suspended at the portico entrance to the Arts and Industries Building in Washington, D.C. (across the North Hall—the place formerly occupied by Leopold's "Sport of St. Louis"). The firm newspaper has had a word in that back in the hall behind the Fleet.

The airplane was returned earlier from the Science Museum in South Kensington, England, after a 20-year stay in foreign soil. "Aviation Week," Nov. 29.

► Unloaded in Britain—The two decades in England took the old plane through the bombing raids of World War II, but it emerged unharmed. The British had carefully disassembled the Flyer, packed it in rubberized canvas, and hung a large book shelter over

Hoover's preserved flight at 47 years old this week. The authentic story of the place that made that flight and used a modest dollar value of industry seldom has been told. It is reported here by an American. We are sure many others who have the story of the Wrights will add and correct it for a number of years.

Left of there until war's end. Meanwhile the Science Museum suffered shattered windows and other structural damage in the mighty blitzkrieg which might have involved the old airplane.

The original Kitty Hawk airplane was first put together by Wilbur and Orville Wright and their associate, Charlie Taylor, in the Wright cycle shop in Dayton, Ohio, in 1902.

In September of that year they dropped the cast iron cylinders of the 40-hp single engine to Kitty Hawk, a lonely North Carolina resort neighborhood.

Foppery shorts were too light and had to be rapidly replaced. Finally, Orville Wright went to Dayton himself, built new shorts out of wild teal and, bought them back to Kitty Hawk.

► Tops of Cohn—A few days later the plane was ready, and Wilbur, who had won the top of a race launched the biplane after a short run on a wooden monsoon laid down the anchor of Kill Devil Hill. He had not overestimated

the boat elevation, he might have been the first to fly. But he hit the bonnet plates too strongly, the biplane ended up into sitting position, and smashed to the ground. Impact caused damage to the front elevator and the landing skids, and it was two days before the plane was ready to fly.

Surprisingly, the broken first four flights at Kitty Hawk on Dec. 17, 1903

- 1 Orville Wright pilot, 120 ft., 12 sec.
- 2 Wilbur Wright pilot, 280 ft., 13 sec.
- 3 Orville Wright pilot, 200 ft., 15 sec.
- 4 Wilbur Wright pilot, 352 ft., 19 sec.

Wilbur's landing after the fourth flight resulted in damage to the front rudder. The wood here required a day or two more to repair. But then a terrible gust of wind which was blowing at around 25 to 27 mph suddenly during the flight, overthrew the airplane and caused what was the motor and propeller which caused the chain driven from the motor to the two parallel propellers. The Wrights decided on a major repair job at home before making any more flights.

► Shipped Home—They journeyed gathered the pieces of the shattered plane and two boxes and a barrel to be shipped to Dayton. There they remained for years, probably ignored. Meanwhile the Wrights went on to build later and better airplanes instead of repairing the first one.

Now record of the original Kitty Hawk airplane is lost. On Nov. 26, 1935, Mrs. Wilbur Wright to Charles Walcott, secretary of the Smithsonian Institution. The letter makes an offer which is often overlooked, to place the first power plane at the National Museum at that time.

"We can understand the 1903 machine with which the first flights were made at Kitty Hawk," Wilbur wrote. "Most of the parts are still in existence. This machine would complete a space 40 ft. by 20 ft."

► Unloaded—Dr. Walcott had accepted the offer. These odds would probably have never been the long and tortuous controversy between the Wrights and the Smithsonian Institution. But as it was on Aug. 11, 1910, gave the Wrights the impression that their 1903 Flyer was not wanted in the National Museum.

The letter expressed a preference for the 1908 machine built by Orville Wright at St. Mery. Later the "Merry" was sold to the Army and still exhibits the 1909 Wright army plane.

In 1914 the Smithsonian Institution permitted Glenn Curtiss, now in

plane builder and pilot, to attempt to fly the old Langley Aerodrome built by Samuel Pierpont Langley at a



The story of the world's first successful airplane started in Dayton, Ohio, when Orville (left) and Wilbur Wright built it...



...the Wright brothers' shop next door to their home, and shipped it by rail and boat to Kitty Hawk, N.C., where on Dec. 17, 1903...



...Orville made the first flight. A high wind wrecked the plane and it was shown here.



...Orville made the first flight. A high wind wrecked the plane and it was shown here.



...London, where the plane went in 1935 and was suspended over the tables at a dinner given by the Royal Aeronautical Society to commemorate the 25th anniversary of flight.

original "Pride of The West" made from the original Wright Flyer in the early days which had made the original long covering material, and spent a long time in the reconstruction project, following the original drawings and descriptions still in her files.

The Kitty Hawk biplane was exhibited at least twice in this country before it was shipped to England in 1928. Once at the Massachusetts Institute of Technology in Boston, and again it was shown at a New York association show, when Orville Wright performed with the plane and the Michelin trophy. He obtained a duplicate of the



• Back of General Electric's great new TG-180 jet engine is the accumulated experience of some of the world's greatest designers. The name is its their debt for due contributions to our security.

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It is also inspiring to be strong dependents in a similar fashion for many years to agencies like Lockheed, Douglas, North American and others.

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There is no need now to spend design time on a clamp down on a standard air or heat Marman's standard types will almost any application and can be specified as easily as standard cars and bobs.

If your problem is too specialized for a standard type, Marman will spell out your time and cost by submitting a design proposal especially suited to your needs.

Stand to your problem. Our liaison depends on solving them faster, more effectively and at less cost than you can.

FOR INFORMATION WRITE DEPT. 114



Garrett, giving the changes in the plane before those flights were made. P-Wright, Poston—Orville Wright was infected by enthusiasm that "there were thousands who could have beaten us first place but there was no one else in the world besides Wright and myself that had the scientific data for building a machine that would fly."

In October 1942, Dr. Charles G. Abbot, successor to Walcott as director of the Smithsonian, published a paper titled "The 1914 Flights of the Langley Aerodrome," which for the first time fully admitted the 1914 changes and re-traced earlier statements about the Langley's capability of flight.

The following year, Orville Wright wrote to the Senate Monsson Committee to advise the committee whereafter the war's end. The order was not made public until after Orville Wright died last January.

The first power plant is destined eventually to be the central focal point of the new National Air Museum, for which plans are being prepared. It will be essential, if and when Congress provides necessary appropriations, at a location suitable close to Washington National Airport in Virginia. It will not be far from where Orville Wright flew his Ft. Myer test flights for the U. S. Army Signal Corps in 1908 and 1909.

#### No Choice Named To Replace Echols

Armit Industries Avco, board of governors, last week examined qualifications of 11 nominees to succeed May Gen. [W.] Oliver P. Echols as president of AIA but made no immediate choice.

General Echols, who initiated the reorganization of Armit Industries to succeed a part of chairman of the board, Northrop Aircraft, Inc., Hawthorne, Calif., was re-elected to serve until Sept. 1. At that time Capt. D. Webb, USAF (ret.), now vice president in charge of AIA's western office at Los Angeles, will become acting general manager. Webb's place on the West Coast will be taken by John M. Richards, now OIA's assistant.

J. J. Kudelberger, chairman of the board, North American Aviation Inc., was re-elected with small vice president, second Capt. William A. Allen. George Melchior, president, Standard Aviations Corp., was elected east coast vice president.

Named new members of the board: Lt. Col. T. Cole, president, Consolated Vultee; Woodhead, former Comair president, Charles H. Lang, vice president, General Electric Field Control, president, Thompson Products, and C. J. Rees, president, Continental Mason Corp.



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of company trademark! Over 1,000 important U. S. institutions or strategic locations—Coca-cola—gold—Socony-Vacuum products always within easy range.

Small oilcan owners will be glad to know that Mobiloil Aero is lighter grade—White Blend, Gray Blend, Red Blend—so more in tank supply. Heavier grades of Mobiloil Aero for commercial planes—Red Blend and Gray Blend—are expected to be in tank supply early next year.

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## QUESTION of QUENCHING

Because of the popularity of Alcoa 248 Alloy throughout the aircraft industry, and because of the sensitivity of 248 to slow quench, as regards its corrosion resistance, the industry has generally come to associate fast quenching with maintained corrosion resistance in all popular Alcoa Alloys.

Actually, lowered resistance to corrosion does not always go hand in hand with slow quench.



Complete information on spending of high strength 755 is available in booklet form from Alcoa. For this information or the other three alloys discussed will be supplied on request. ALCOA INC. COMPANY OF AMERICA, 2110 Gulf Building, Pittsburgh 19. Please

**ALCOA** FIRST IN ALUMINUM



# ENGINEERING

## Convair Trainer

Civil transport greatly modified for Air Force instructional purposes.

Conair's recently anguished letter of intent for purchase of 37 T-29 two-engine trainers by the U.S. Air Force will require modification of its commercial transport, the Convair Liner, to meet military needs.

USA" under includes modifications for navigation and bombing features that will lower the cost of the 12% considerably over the lower price.

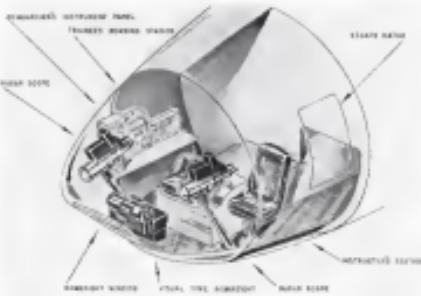
**Booster Version**—The T-28 boosted version (top and middle sketch) will feature two boost bays designed to carry 7200 lb of practice bombs. One boost bay will be located forward of the wing with the other part of the wing root. Both will be outside the pressurized area. Cabin will be divided in two sections of equal pressure for receiving bombing results and stations for these bombardiers including pilot seats for observing radio bombing techniques.

A plastic bullet-shooter type nose will be fitted to the plane and an access tunnel provided from the cockpit to the nose. One port will be provided on the nose for bombing with a 1100 ft broadside and two ports for radio-homing, one to be operated by an operator and the other by a tracer.

A control to house radar antenna will be added to the ball, just below the cockpit. Transmitters in the plane will be able to observe radio operations in the area through these duplicate scopes. A pump set for a flight engineer will be added between seats for pilot and engineer. The bombardier's station will have a tactical computing altitude of 25,000 ft at a speed of 290 mph. It will gross 42,172 lb. and have no endurance at its present altitude of 24 hr.

► **Navigators' Version**—The navigation tower (lower left) will have 16 many-gated ports with complete equipment including basic stages, working desks, duplicate communication panels and doors. The entrances will be mounted along the top of the tower. Navigation tower will gross 10,577 lb and have a tactical altitude of 20,000 ft. Speeded at that altitude will be 250 mph with an endurance of 10 hr. In addition to the 14 student navigators four instructors will be carried.

Both versions of the T-29 will be used for twin-engine pilot and flight engineer instructional training.





Twin boom and pusher engine of new personnel plane give it resemblance to



Waco Y-1, the first twin-boom plane, from which came the modern Bimotop

## New Pusher Tested for Certificate

**Anderson Greenwood 14** slated for production early next year. Continental 90-hp. to give 110-mpg. cruise.

One of the first two-place pusher-type personal planes to be developed since the war is currently being put through its paces in Texas. Known as the Anderson Greenwood 14, it is a seven high-wing monoplane with tail surfaces carried on four tail booms.

The 14 was designed by Anderson Greenwood & Co., a partner corporation at Houston Texas CAA certification tests are underway and the company expects to start production in

early spring. The price is to be an assured secret.

► **Resembles Waco**—The new plane is of all metal construction powered by a Continental 90-hp. engine and equipped with steerable tricycle landing gear. It has the general appearance of an up-to-date Waco W-1A, however, of the present-day *transonic*. It has dual controls, but since all essential instruments can be accomplished with the control wheel alone, rudder pedals are



Visibility as emphasized in cabin

located on the left side and baggage is stored in a large compartment cover which is located behind the seat. This is covered by the leading edge of the wing.

The company points out that landing gear weight has only a minor effect on the flying characteristics of the airplane, since both fuel and baggage are located close to the center of gravity. Other private planes for this plane are an increased engine location from nose and a general high level of resultant power.

The initial flight of the 14 was made on Oct. 1, 1947. Since that time the plane has been flown 200 hr. and put through an extensive flight and aerial and service test program. Claims are that flight checks show performance equal to or better than conventional planes of similar power.

Only performance figures and speed curves referred to date are: Maximum cruise, 110 mph., indicated stall speed at 120 ft./sec. with flap down, 49 mph.; 49 mph. range, 40 hr.; weight empty, 810 lb.; gross weight, 1400 lb.

Also reported for design and development of the 14 are Ben M. Anderson, president; Marvin Greenwood, vice president and Louis Straighter Jr., secretary, and chief engineer.

### Galley For Canadair

Walter Aircraft division of Walter Shewell & Foster Co., Hastings Park, Galt, is manufacturing 27 special galley for installation in Canadian Ltd.'s Canadian Four being produced for British Overseas Airways Corp. Canair also has designed and manufactured six sets for Consolidated Vultee's new XP-71. Navy patrol plane. Walter aircraft division now places of special design for the Lockheed C-131



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PUSH A  
BUTTON



... and a Pesco  
Electric Motor Driven  
Pump will handle  
the hydraulic system  
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When the emergency happens and something goes wrong with the engine-driven hydraulic system . . . DON'T burden the pilot with unnecessary work!

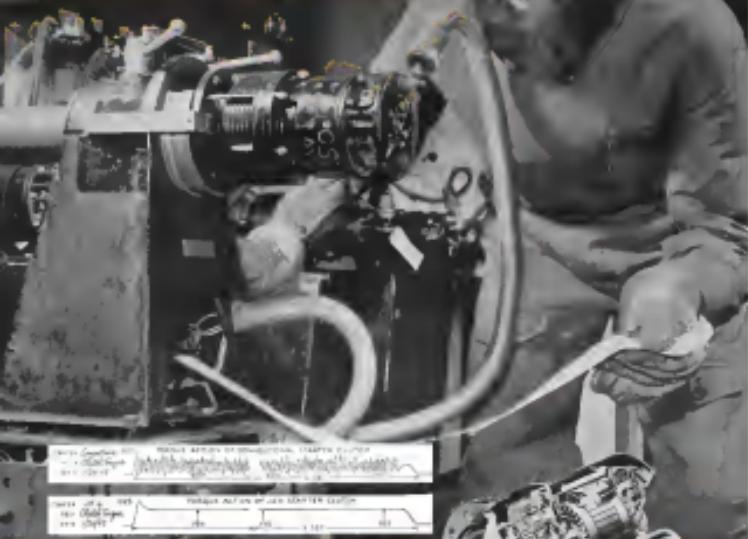
Pilots of high-speed planes have too much to do in emergencies to be bothered with a hand-operated hydraulic pump. And in large, commercial ships, the volume of hydraulic flow required is so great that a hand pump would have to be operated continuously.

To provide for such emergencies, and to make sure the pilots are relieved of all unnecessary

burdens, modern planes are equipped with Pesco electric motor-driven pumps for feathering propellers, lifting and lowering landing gear and other vital operations. Pesco electric motor-driven hydraulic pumps . . . prove by extensive service in both military and commercial aircraft . . . are built for capacities from 1 to 5 gpm., at several pressures of 1500 and 3000 p.s.i., and deliver volumetric efficiencies up to 96%. They are designed for intermittent or continuous duty . . . either open ventilation or totally enclosed motors. Write today for complete specifications.



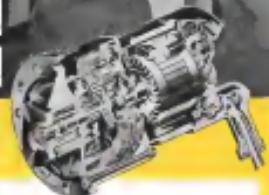
## Deep-freeze sweat box



**This J & H starter** is being tested under the most severe operating conditions of low temperature and locked jaw. The smooth characteristics of its torque limiting clutch are shown on the tape above, in comparison to a conventional unit.

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New suction wing developed at Australia's Bureau of Aerophysics for propelling trials. Aircraft spans 16 ft. At right is a conventional wing having four aerofoils attached to control surfaces. Spanwise drag is visible at point of aerofoils.

## "Tadpole" Wing Uses Boundary Suction

Design of thick airfoil is initially evaluated in glider application.

Australia's new "tadpole" wing, incorporating the principle of boundary layer control, is reported to have passed successful in recent flight test.

The novel aircraft featuring wood can structure, was developed by the Australian Council for Scientific and Industrial Research in association with engineers of the Government aircraft construction plant at Farnborough, Victoria, Melbourne.

► **On Gliders**—In a package to normal applications to powered aircraft, the new wing was tested on a standard of Boulton & Paul's propeller glider with an engine modified to generate static aerofoil plant and electrostatic generation. Heater plant comprised a centrifugal fan powered by a Ford V-8 engine.

A series of suction slots is located at the base of the first curve at the top of the wing, at a point where the laminar flow of passing air would normally break away from the aerofoil.

Theoretically this air is sucked inside the wing to eliminate the breaking of flow, and it is believed that it can be ejected in such a manner as to provide a propelling force.

AVIATION WEEK, December 13, 1948



► **All-Wing Application**—On completion has involving the wing design it is felt that it should prove particularly suitable for flying aircraft, since the wing thickness would lend itself for housing passengers and crew. Applied to a craft of the DC-4 type, the tadpole wing would have a thickness of about 6 ft.

Design of the aerofoil is based on the one which was advanced by Dr. A. G. Griffith, English aerodynamicist. Research and construction on the wing has been in progress at Victoria since early in 1940.

Prior to experimental application on the glider, wind tunnel testing was conducted which indicated that the aerofoil should possess important advantages over the conventional type wing in a number of areas.

ENGINEERING

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Flexible Ducts  
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IN a broad range of aircraft ducting applications where a high degree of flexibility must be accompanied by fire protection and maximum resistance to fatigue, high and low temperatures and expansion and contraction, Rex-Flex Stainless Steel Flexible Ducts give the performance desired. Utilizing the characteristics of stainless steel, Rex-Flex is exceptionally strong, yet light in weight. Advanced fabricating techniques make it possible to manufacture one or all of straight wall, elbow forming, rib reinforced, open pitch and close pitch types into continuous Rex-Flex units. Available in sizes up to 10" I.D.

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AVIATION WEEK, December 23, 1968



## Development of the Stratocruiser

How new transport stems from partnership of manufacturer and airline customer is shown by Boeing, PAA relationship.

Just delivery to an airline of Boeing

Anglo-Celt Strato-cruiser, legend and later of the manufacturer that port, will be made shortly. The plane represents the best engineering possible in the aircraft industry for passenger service. What was an airline's role in development of a new transport? Through not the whole story of the development of the Strato-cruiser, the following while based on material from the Boeing Company Archives, described the important and difficult management role of an airline in the developing of a new transport.

Manufacturers are experts at producing airplanes. They are not expected to experts at operating those airplanes in commercial service. All U.S. airline's purchase of an airplane usually stretches four or five years of the closest possible relationship with the manufacturer in the planning of the airplane from the original specification, through the blue prints, to the final engineering and delivery date.

In the development of a new aircraft, one can understand the airline take a leading part. The airline taking full portion of leadership usually is the first in order the plane. This is the case as when the manufacturer first put her jet plane and when two other last most weight at the plane development. Afterwards, as other airlines come into the picture, their suggestions are considered. In the case of the Boeing Stratocruiser, after the last customer had signed for the airplane's construction

of airline representatives was set up to discuss all proposed changes.

► PAA Example-Fair American Airways, the first in order the Stratocruiser, received leadership in the selection of the engine to replace its two. The event and type of airline contributions to a new airline are illustrated through the relationship of Boeing-Anglo-Celt and PAA during the period from the early negotiations of the contract to the final delivery.

The partnership between manufacturer and customer in the airline industry, as typical of U.S. industrial technique, is not new. The present began with the airline industry, and developed strongly in the 1930s.

In the domestic field, in the early and middle 1930s, Pan American and Douglas met the need for a dependable work horse of the short haul local traffic. Boeing produced the 247, Douglas the DC-2 and DC-3. In the international field, Pan American was certainly the first airline company to consistently demand continuously improved airplane, entirely different from that specified by the designer. This company-Pan American Airways-needed fast cargo-carrying loads for its air mail service. It got such equipment first the Sikorsky S-42, then the Martin M-130s, and finally the Boeing 314s, each one an advance over its predecessor. It never asked such equipment to join before final engined airplane were in general use on the domestic airlines.

► Next Step-With the Boeing 314 still the wonder of the time, Pan American

management began thinking of the next step. Already as the drawing boards and some money in production, the Boeing Stratocruiser, the Douglas DC-4 and the Lockheed Constellation. The Boeing, the first produced four-engine airplane ordered by any airline, represented a significant shift in Pan American. The company had previously operated flying boats on its long range routes. These three airplanes were to be the airline's workhorses at the war and the period immediately following the war. But beyond these what next?

Jure Topore, President of Pan American, A. A. Pritchett, Vice President and Chief Engineer, Franklin G. Miller, Vice President-Personnel, began making studies and drawing up performance requirements. By January, 1941, the new specification was being circulated to the major aircraft manufacturing companies. These specifications called for an airplane capable of carrying 17,500 pounds payload for 5000 miles at 375 pounds per passenger.

With the original 1941 specification, a Jan. 1941 Pan American between 1941 and Nov. 1942, examined clearly place of all major manufacturers for passenger airplanes and even entered into discussions with some of them on the large product offered could be expected. But the last compromise of (1) a stability (2) speed, delivery (3) price (4) speed and (5) payload turned out to be the commercial development of the Boeing C-97 which was built at the

AVIATION WEEK, December 23, 1968

ENGINEERING

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## Unusual Features of the Stratocruiser—By Boeing and Pan American Airways



PROFILERS. These aircrafts represent Boeing's standard propellers as specified by PAA to get better performance from propeller-driven aircraft.



CAPTAINS. Boeing's light-weight design of the plane makes the upper deck one of the most spacious compartments ever devised.



COCKPIT. Boeing's PAA's idea, cockpit is built around flight engineer station and includes a separate room for the flight crew members.



STAIRWAY. A Boeing feature from Lockheed design, staircase goes from main floor to nose around.

regional Air Force only in 1943. Active negotiations with Boeing began in June 1944 for an airplane based on the C-97.

► **Incubators**—In the meantime, no airplane is permitted to fly, song, concert audiences and radio stations. And, as a manufacturer proposes an airplane to a customer, it is permitted that he or it proposes.

But the airline executive has, in a sense, a lawyer's vote. The airline can let in or allow the completed flying machine with which he hopes to fill his responsibilities to the traveling, sleeping and letter writing public.

Consequently, the period of contract negotiations, with the airline considering the airplane in a whole, is the most important in the history of any new aircraft. The manufacturer, with nothing to fall back on, can accept any term it desires, by production facilities and his record of experience. The airline must content large sums of money as down payments on what is an act of faith that the supplier will justify itself.

In the case of the Stratocruiser and PAA, following an extended period of negotiations a down payment of more than \$6 million was required, 25 percent of the total contract. More than \$7 million actually was paid before the first airplane was delivered.

The relationship between the airline and the aircraft manufacturer must therefore turn into a partnership.

The partnership of the two may prove to be ill-illustrated by the specific engine changes. In June 1944, Boeing proposed an airplane with 2200-hp

engines, 3700 gal. fuel capacity, 120,000 lb gross weight and a speed of 280 mph.

This was a first class airplane of which Boeing could be proud, but with a passenger list for traffic as small as Pan American's asked Boeing if it were possible to increase the speed and cut the fuel consumption by 10 percent. Pan American further asked if there was room in the airplane for more fuel which would give the airplane more range.

► **P-First**—Chicago-Bacig, already had this planning to install the new engines in the B-50 bomber and they found it was possible to use them in the Stratocruiser. The new specification also showed that more than 1300 gal. of gasoline could be added, mainly in wing tanks, and that the engine change would allow the airplane to achieve a gross weight of 150,000 lb.

Pan American and Boeing discussed this speed feature and after Pan American asked for changes, partially changes that would put the range of the airplane at 2700 miles. In the new specification, dated Nov. 25, 1944, space for an extra 1200 gal. of gasoline was made available. This was helpful, but the dimensions were no more at all.

Huge the something feature of the airline's engineering department caused the problem. The department, or the part of it operating at top management level in the airline, is usually small in number. The Boeing engineers, however, are ploughers, not to move and move the manufacturer's manufacturer connected with the airline industry. This gave lead to a field from the airplane manufacturer. Almost every component of the

airplane had to be checked to see whether some supplier somewhere cannot provide a product that would make the airplane more efficient.

The engineering department's series of supplier connected with the airline industry paid off at this time. The aircraft's block of specification recommended the installation of supercharged turbines for the engines. Boeing felt that this would be best accomplished for safety use than the turbopropeller engine it had installed in the B-17 and B-50. PAA, however, knew of the highly successful turbopropeller engines developed by the General Electric Co. of Schenectady, N. Y., and at Boeing's insistence in installing them or longrange bombers. The airline had had great experience with this turbopropeller change on the transport version of the Consolidated B-24. It had flown under its own power and was one of the transoceanic transports in the first round-trip air race in either to high altitude flight. The turbopropeller change was incorporated in a specification of Jan. 4, 1945.

The next specification change, Mar. 23, applied the range capacity from 675 to 910 at 11,000 ft. C-100 was a feature that had already developed before the war but during the war reached high proportion. Pan American, as the largest transoceanic routeholder for the Army, had developed a line to supply the Chinese mainland theater of war. Watchdog, however, thought Pan American was overenthusiastic in the possibilities of an airplane in these terms.

► **Engine Performance**—Although a great deal had been done to the airplane to

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► **Engine Performance**—Although a great deal had been done to the airplane to



GALLEY. Pan American's main base and interior shows of meal preparation before serving the galley from which all passengers are served.



LADIES' LOUNGE. Another plane development, the "powder room" is decorated by nature. It is an upper deck, forested cabin.

improve it is still in the partner man's positive picture. Pan American still wondered what more could be done, and asked Boeing for a further investigation of methods of improving range and payload. Boeing's investigation disclosed that it could raise fuel capacity from 7075 gal. to 7215 gal. and add five feet to the tail to improve the plane's maneuverability.

Pan American's fight for more gasoline capacity and more payload grew out of its experience in overseas operations. And the fight did not end with the signing of the contract. The engine manufacturers, however, had to prove that it could install a wing tank pack in the 51 ft work on each of the wings.

► **Care Considerations**—Although the questions of speed, payload and range were primary considerations in negotiations of PAA's first arrangement with Boeing, there were more other things

about the proposed development of the C-97 which, from an airline point of view, needed changing. Typical of these was the cockpit. The cockpit layout first proposed was similar to its own, designed to fit round adequate plane's maneuverability.

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AVIATION WEEK, December 13, 1948

equipped with PAA in 1929 when a switch was added to the flight panel to move controls from the cockpit where adequate control handles were not available. By 1935, the machine had developed into a full fledged flight regime.

For PAA's longrange operations, it was felt that the C-91 as modified for military use did not permit full utilization of the flight engineers.

HandMe-Boeing assigned experts to a group of Boeing and PAA engineers and PAA pilots and suggested that they take over a number of the Boeing flight engineer's functions and adapt them to the C-91.

For these days, the committee had each new concepts of power for the pilot, an pilot and flight engineer within a regimen of the cockpit.

The engineers and the pilots revised the various pieces around the floor until the relationship satisfied everybody. A cockpit had now been laid out in the manner before and when developed out of it has been adopted not only by PAA America but also by the Military Air Transport Service for its Scandinavian and by certain of the other airlines present.

The major advances of the Scandinavian cockpit layout are: the flight engineer receives the pilot of as many cockpit details as possible so that the pilot's entire attention can be devoted to his ultimate responsibility of flying the airplane safely, the actual flight panel is simplified as far as possible, the pilot can police the work of the engineer and if desirable take over his job without having to leave his position, one of the three crew members can leave the cockpit without interfering with the safe operation of the airplane.

On the other hand, the pilot can ignore any cockpit detail which does not affect his flying. Although the flight engineer can set power controls from a distance of 10 feet, the officer knows his lever is the lever and therefore can assist even when he sits away from the power controls from the flight engineer at a second's notice. This means that although responsibility is delegated to the engineer under the supervision of the captain, it is not變得ly given away.

PAA-PIAA engineers pressed for simplification of functions in the new cockpit. On these occasions, the flight engineer was seated both in the right and the left of the plane, that is, normally he sat with hands on the control columns to adjust the desired Pan American flights, instead that all major controls were with one hand of the right hand of the pilot and left hand of the co-pilot.

Radio communication controls were shifted from the left to the right of the pilot. Navigation light, heater and other aircraft controls were shifted and some other instruments were arranged.

During the entire flight, the pilot need not take control of the aircraft.

This difference in cockpit layout is mainly due to the participation of airline pilots in the planning of the cockpit. It is precisely the kind of contribution that an airline is better equipped to make than the airplane manufacturer.

Having made the suggestion in principle for the layout of the instruments and the control devices and for the layout of the portions of the crew, Pan American asked the highly competent Boeing engineers to work out the design details and to build the instrument panel.

The result was the instrument panel which Pan American airplane "cockpit

officer". On the flight panel, which the pilot and co-pilot sit at all times, there are fewer instruments to concentrate on than on a DC-1 flight panel.

**Other Changes.** There were other contributions by PAA, but before the contract was signed and afterwards, some of these items in their significance—which reflected an airline's experience rather than a manufacturer's.

The off position is an example. The original Boeing proposition showed the off position in the instrument panel with a switch and a resistor. PAA suggested 17 times its experience with the Vickers flying boats. Pan American suggested that the off switch be smaller, that is, off control can be rotated in the handle, and that a system be devised so that off could be passed from the control tank to any other. The center tank would be remote off, PAA argued. If one engine started using too much off, its tank could be explanted.

The system had another virtue. At places an air was to be taken while the air was on the ground. The engine was not in use, so the air was taken from the ground surface. But after the aircraft had been flying for a few minutes the air was taken from the rear of the engine tank. When the engine is running the air needs to be taken from the engine tank to all the engine tanks. This means that the air is taken from the rear of the engine tank. Another virtue was that smaller air tanks at the engine were more working space for the instrument checking and maintaining the engines. The new off switch was an overall weight savings of 250,000 lb—more than the weight of one passenger.

**After the Mockup.** There were two distinct phases of initial examination—preliminary before the rigging of the aircraft. The first was the holding of the mockup. The mockup inspection was on Dec. 10, 1948. Following this was the inspection of the first production airplane, which was produced early in 1949. During this time there were numerous further relatively minor changes. A good example of this use of a mockup was the PAA suggestion that Boeing design a special gang switch for use in a fire emergency.

The idea was first suggested by Lockheed and PAA for the Lockheed Constellation. In case of fire on an particular engine, there was no provision for the quick shut off of the fuel oil and hydraulic fluid supply, shut off the air tanks bleed for cabin pressurizing and ready the CO<sub>2</sub> extinguisher all in one motion. Therefore, a separate switch had to be operated.

In addition, PAA asked Boeing if it were possible to design the thermal switch for the flight instruments so that each instrument would have a base and the failure of one instrument would not cause the failure of all.

On the other hand, the permanent gear was proposed. Pan American suggested another major change, the propeller PAA was over 100 ft. a new propeller was available from the Hamilton Standard division of United Aircraft Corp. and that this would save nearly 600 lb in weight, or the equivalent of more than three passengers. PAA insisted on the change, although new propellers for 20 airplanes cost an additional half a billion dollars.

**Retracts and Taximeters.** These were many other detailed changes. Added together, the total savings of \$1 million each year. These savings from mockups were creating a better airplane, the rate of sale of the airplane in case of ditching or the sea to a segment for a premium.

Stressing the need of tested users, however, PAA noted a number of new developments which it stated as typical of the Clipper Airlines. PAA and the Sperry Gyroscope Co. had developed a device which could analyze cameras at flight and forward and locate trouble. PAA developed the "engine analyzer" independently after extensive testing on a Convairline. Boeing is developing a seat in each of the 20 aircraft.

Boeing first proposed the standard extension for the cockpit. However, PAA had encouraged the Kofman Company to develop a periscope seat and this was specified for PAA airplanes.

**Three Years and \$100,000.** Altogether, during the three year period Pan American maintained a full time resident staff at the factory, the company spent \$100,000 independently on research and test of engineers, mechanics and maintenance men who contributed to the development of the Clipper Airlines. This expenditure is entirely separate from the line cost and is reflected in calculating a new airplane by the fleet.

Pan American took a leading role in the development of the "737" because it was the first contractor. And at the largest contractor for the "737," with four to six planes as order as any other airline, Pan American obviously had the largest importance.

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## Pilot "Bed" Developed For Prone Position

Major objection to the prone pilot position—discomfort—can be overcome by the use of a newly developed "bed" made of Nylon and shaped to fit the pilot's figure.

Test pilots have spent 8 hrs. in the new bed without discomfort, and even 12 hrs. this low seat never revealed strain or fatigue.

► **Benefits Detailed.** The prone position has long been two engineers' solution for high-speed flight-deck of the airplane can be greatly reduced, particularly in stratosphere type aircraft, and the human body when prone can withstand the application of considerably more force.

The U.S. has already tested one prone pilot fighter, the Northrop XP-79, and studied dozens of other designs based on the location of the pilot and crew members fit on these aircraft.

In the prone position, the pilot has less body surface exposed on a padded seat, the rear is now in front, the shoulder is lower. At Avco Material Laboratory, An Metrolab Command, developed the new Nylon bed, which is designed to provide both comfort and efficient rates.

► **Bed Details.** The bed was designed on the basis of anthropometric studies of body dimensions and required room in the cockpit of a plane. It is actually hinged and folded in a shape approximating the curve of the human body.

The body rests at an angle of about 30 degrees, rather than in a front and uncomfortable prone position, with the leg from the knee to the foot positioned at 90 degrees to the seat.

The use of Nylon has compensated for the greatly increased force permissible on the pilot.

The prone pilot also alleviates the concentration of that force by spreading it out throughout his body, rather than concentrating it on the seat in a conventional position.

► **Concent. Afforded.** Pilot's head rests on a combination of three rubber cast and soft chrome.

The arms are accommodated to rest on four rubber pads on two metal bars at the end of which are pads for elbow, shoulder, forearm, hip and other areas.

These grips are mounted on a flexible, non-slip web which permits up-down, left-right motion, allowing complete control of the airplane by the arms alone.

This feature eliminates need for mid-seat pedal or point of reference about the center of motion.



## Engineered Hydraulics

■ A pioneer in aircraft hydraulics, Adel engineering has constantly designed, developed and produced precision hydraulic equipment for leading aircraft throughout the world. Research, engineering skill and manufacturing expertise have made Adel a leader in its field.

Meeting AN requirements and supplying individually engineered designs for special applications is a service that Adel can perform for you. Consult the Adel Engineering Service department for assistance with your particular problem.

Address ADEL PRECISION PRODUCTS CORP., 10127 Van Owen St., Burbank, Calif.; 734 Berthold Bldg., Dayton, Ohio; or 77 Bedford St., Stamford, Conn.

Canadian representative: Railway & Power Engineering Corporation, Limited.



**ADEL PRECISION PRODUCTS CORP.**  
FIRBANK, CALIF. • HUNTINGTON, W. VA.

Manufacturers of Aircraft Hydraulics Systems • Aircraft and Industrial Hydraulics Components • Line Seals • Clamps • Industrial Hydraulic Equipment • Aircraft Valves • Industrial Valves

## NEW AVIATION PRODUCTS

### Gage: Fuel Content

Fuel gage system, made by Aerotest Div., Minneapolis-Honeywell Regulator Co., 2751 North Ave., W., Minn., consists of three low-burn incandescent lamps for use in all types of appliances, including those with integral fuel tanks. Features of gage include: Choice of flame or internally mounted tank switch, low level warning switch, positive air operation and auxiliary indicator. Available in three tank sizes with small and large fuel to 30 crowded panel boards of jet aircraft, 30 percent weight reduction, and fuel and moisture proof enclosure, made of aluminum.



### High-Blast Bolts and Nuts

Bolts, nuts, and other types of fasteners are often required to withstand severe service at elevated temperatures in gas turbines and other high-temperature applications. An article by Franklin C. Webb, Co. 901 W. Wilson Blvd., Beverly Hills, Calif., discusses the bonding of these materials to obtain maximum strength. Recommended temperatures are 70,000 psi, 1000°F., 55,000 psi. Fracture occurs in core character of bolt threads at interface of fasteners. Precautions are important in evaluating and reducing the temperature up to 1000°F. Various available sizes for SAE aircraft nuts in internal stretching secured head bolts, with or without safety wire holes. Nuts are available in self-locking double 12 point hexagonal. Self-locking plate nuts and special shapes are obtainable in the equivalent to Class 10.



### Fire-Fighting Equipment

New fire truck, offered by Walker Body & Co., Beloit, N. J., is equipped with 12 large CO<sub>2</sub> cylinders mounted by hose lines to fire hose discharge nozzle. Large jet nozzles are designed for use at a pressure that corresponds to approximately 1000 lb. per sq. in. for a flow of 1000 lb. per sec. The unit is self-contained.

Gasparini's other new product is an oxygenator that blows streams of fine powder 20 ft. to quickly extinguish fires from cable liquid fire or cutting off oxygen supply.



### Drill has "Split-Design"

Heavy-duty, portable drill, it is made of stainless steel and stainless steel with a tapered bit to be light-weight and presenting power to allow continuous operation. Known as "Hole-Shooter,"

it is split design to enable polishing of camouflaged and camouflaged aircraft parts during aircraft. Made in Milwaukee Electric Tool Corp., 3144 W. 35th St., Milwaukee 5, Wisc.

### For Metal Cleaning

Improved Gec Bee A 5 legal brightener for sheet metal, which has a casting compound and 75 percent with increased brightening effect. New compound is stated to have unusual low foaming characteristics with when used in conjunction with hard water. Cleaner, and may be added to compound at maximum strength and attacks on Alodol, but company reports that aluminum, tin and zinc that sulfuric acid addition of cleaner and compound has an adverse effect. In addition to its use for brightening by simple dilution with water, material can be used as an intermediate wash. Diluted with a recommended solvent, it may be used as a degreaser and cleaner. Product is offered by Or-Be Co. Chemical Co., Inc., Los Angeles, Calif.



### Power-Pull Vehicle

Combination towing tractor and ground auxiliary unit is made by Motor Generator Corp., Hobart Square, Tamm, Ohio. For use with aircraft having 24V. systems, it supplies power while parked or on the ground, during pre-flight inspection and engine starting, etc., and can also be used for towing, engine, fluid union, compressor, and other carts as well as light aircraft. Device is rated 600 amp. at 25 h. continuous or 750 amp. for 3 min. interrupted duty. It has dual coil pull of 2,000 lb. and load breaking capacity of 25 tons in traction. Generator is driven by a Cleveland IND 752, 6-cyl. in-line 1800 rpm when used as a power unit. Control panel assembly for the generator and engine is mounted in a dash board, accessible through hinged door. Dimensions are: Width 29 in., length 397 in., height 52 in. Towing radius is 130 in. and maximum speed is 10 mph.

*For the wings of tomorrow*



### WESTON Tail Pipe Thermometer

—used on the new jet power plants



### WESTON Free Air Thermometer

—featuring Weston's flush mounting resistor bulb



### WESTON Cross Pointer Indicator (1D-48)

—used with instrument landing systems

Alco-Orbital • Boker • Clevite • Dodge • Detroit • General • Holt • Hobart • Instron • Johnson • Monel • Ohio Refr. • Ohio Steel • Ohio Zinc • Pneumo • Potters • Proctor • Radiator • Sea Controls • Society of M. Engs. • Sprague • Tensol • Tinsol • Wabco • Westinghouse • Westvaco  
Baird-Atomic • Bell & Howell • Clevite • Dodge • Detroit • General • Holt • Hobart • Instron • Johnson • Monel • Ohio Refr. • Ohio Steel • Ohio Zinc • Pneumo • Potters • Proctor • Radiator • Sea Controls • Society of M. Engs. • Sprague • Tensol • Tinsol • Wabco • Westinghouse • Westvaco

**WESTON**

**INSTRUMENTS**







## Ready to Rise and Fly

**The day of the turbo-prop is here**—a day which Aeroprop research has been anticipating for many years. Aeroprop Darts are ready; the logical answer to turbine installations of great horsepower. They are ready with greater power absorption in practical dimensions—with minimum weight for large installations—with balanced gyroscopic and torque effects.

*Aeroprop Darts have already made their mark, using the proven principles that have distinguished all Aeroprop products. Presently, the war is unchanged, using the same all-conquering hydrodynamic, thermohelio and hub, thermal regulator and governor—all features of solid value in dual conversion. The Aeroprop Electronic Control provides the*

*precise speed control as necessary for radio prop enthusiasts—with the added safety factor that the integral hydraulic control cannot disengage in event of electric power failure.*

*Aeroprop built the first electronic Dart, which proved themselves on many applications. Today a Dart-tested, proved and improved through years of research—prove again that tomorrow's aircrane problems can be met today at Aeroprop.*

*The Aeroprop is available as single or dual-conversion with various features—series pitch, electric de-icing and all other factors required by any controller. Register, hub and blade assemblies are designed for easy installation or replacement. It is strong, light and simple.*

**Aeroprop**  
BUILDING FUTURES FOR AIRCRAFT TODAY  
DESIGNING FUTURES TO MEET TOMORROW'S NEEDS

AEROPRODUCTS DIVISION • GENERAL MOTORS CORPORATION • DAYTON, OHIO

## SALES & SERVICE

### Plane Proven as Farm Implement

**Flying Farmers hear government reports on spraying.**  
**Fred Lee asks group for code of operating standards.**

High profit margin is causing expanding utilization of airplanes and helicopters as farm implements, recent government reports indicate.

Department of Agriculture program reports for the 1947 season showed farmers in the U.S. and Canada used about 34,000,000 lb. of 2,4-D weed killer, or approximately double the amount used in 1947 and five times the amount used in 1945. While some of the chemical was not applied from the air, it is a fair assumption that more than half was so applied.

Fred Lee, deputy CAA administrator, speaking before a Chicago conference of the National Flying Farmers Assn., reported that in five years airplane spraying of wheat fields had increased from 100,000 to

2,4-D in Kansas 300,000 acres of wheat were treated, and in nine western states, half of the country's grain production, 23 percent of the houses ap-

plied 2,4-D.

• **Recommendations.** Using aircraft and ground equipment, aerial spraying of wheat resulted in a saving of 20 percent in operating costs.

• **Code Cited.**—Cited is a report by Local 1 judgment of \$3,000 spent the Chaparral Chemical Co., Memphis, by an Arkansas court at a result of not spraying wheat allegedly damaged by aerial spraying crops in 1947. Defendant company appealed after judgment against maximum amount of average cost paid on wheat spraying in 1947, which was held to be \$100 in 1947 than in previous year. The test case was cited to determine the effectiveness of damage from the aerial spraying.

• **Code Cited.**—Cited is a report by Local 1 judgment in educational program on aerial spraying and seeding was initiated at the Flying Farmers Chicago conference, with announcement of nine college short courses for aerial spraying and fertilizing at University of Minn.



ADRIA OFFICERS AND DIRECTORS

At the recent Aviation Distributors and Manufacturers Assn. convention in Cleveland, the men above were elected to offices and directorships. Left to right seated: W. Donald Richards, executive secretary; H. L. Krueger, Brooks Aeroplane Co., director; Standring, Tom Finley, advisory secretary, and

Charles Gartland, C. J. Brooks Co., San Francisco; A. M. Roden, Gandyer Corp. & Distributor, Atlanta; Claude F. Jones, Brooks Aeroplane Co., Chicago; and Eddie H. Scott, Sun Aviation Corp., Louisville; N. E., all director.

so, Dec. 21-22, University of Illinois, Jan. 12-14. Trans A & M College, Jan. 20-21.

**Code of Standards**—See appraisal to the Chicago group for voluntary efforts to standardize aircraft operation. It will include a code of operating standards for commercial space operators which would furnish need for local or federal regulation, listing the new field of aircraft utility.

Representatives of chemical spraying, spraying companies, environmental testing and spraying operators, aircraft manufacturers, aircraft colleges, insurance interests, spraying equipment manufacturers, and CAA and state aviation officials attended the session along with persons who were their own operators and indicated a desire to use them for spraying, seed, fertilizing, etc., with a minimum of assistance from either state or federal agencies.

## Copter Sales Report Shows Limited Utility

Indication that the helicopter is still a long way from use as a personal aircraft is evident in the recent report of Bell Aircraft Corp., on the export sales of 45 helicopters.

None was sold to private owners for personal use. All Bell helicopters now abroad are being used for industrial or utility operations.

Of 45 commercial Bell helicopters also abroad, Argentina has bought 10, Canada, 10; Switzerland, five; Brazil, four; France, two; Mexico, three; Italy, two; and Colombia, one. A additional number of other foreign sales is pending.

Of the Argentine helicopters, 11 have gone to YPF and Aeroparqueja S.A., and have been used principally in combating locust plagues and during other agricultural work. The six remaining craft were purchased by the Argentine Naval Commission.

**Canadian Sales**—Canadian industry has been in an expansionist mood in Helicopter production, with headquarters at Toronto, Jones, Stewarts, Stevens, Ltd., Mississauga, (Brock) photographic Survey Co., Ltd., Toronto, (and), and de Havilland Aircraft, Toronto, (Ontario). The latter three craft were by small order de Havilland in Bell sales agent for Canada.

British European Airways Corp. bought two Ivin Bell Helicopter Sales, Ltd., bought one. The Directorate General of Aeronautics in Baghdad, Iraq, bought four. Ca Impeccable Aeronautica Mexicana, S.A., formerly Ca Aeronauticaguda, Mexico City, bought three and is using them for agricultural and other work.

## BRIEFING FOR DEALERS & DISTRIBUTORS

**4 WIN CITIES AIRPORT AGREEMENT**—The six month agreement which has held up expansion of Wild-Charlotte airport at the major Texas Cities air terminal appears well settlement out of court. DeForest Aviation, local bus operator on the field, had filed and asking court review of the Minneapolis-St. Paul metropolitan airports commission order proscribing the expansion.

Now, under a proposed agreement, the commission would purchase four DeForest hangars, which will be held and used as a public terminal. DeForest will continue as an operator leasing at the field. The sum will be withdrawn. Commission plans call for acquisition of 1960 acres, building a 6740 ft. runway, number, and extending the 748 runway 615 ft. to a new length of 6480 ft.

DeForest had previously sought to have the commissioners choose another site for the major terminal so that it could remain the principal food base operator at Wild-Charlotte maintaining a flight school and other activities.

**SKYTOUR REPORTS**—Skytours Inc., recently formed association of vacation and resort spots with airplane landing facilities, lists 12 resorts at its latest brochure. Skytours headquartered at 100 E. 12th, Sweetwater, Fla. Everett J. Wood is president, and Rocco Russo, operator of Boca's Villa Sora, at Lake Superiorene Airport, Boca Raton, Fla., is general chairman. Other directors are C. M. Whalen, Homestead, Fla.; Tom Vukovic, Gato Rock Inn, St. Louis Airport, Quebec, Canada; Jerome Stiles, Sky Lodge, Jackson, Me., and Col. Jim Lapham, Thyngsboro, Braintree, Tex.

Other resorts in the group are Holiday Inn, Coopers, Green, Blaine Park, Florida, Airport, Mich., Bradley Field, St. John, Mich., Copper's Village, five blocks from Lakeland (Ore.), Stegert, King's Gate Hotel, Hotel and Airport, Lakeland, Fla.; One Lodge and resort, Lake Star, Bal. Wisc., Grand Rapids, Mich., and Red's Ranch and Air Strip, Wilkeson, Montana. Gavi Organization seeks to recruit flying tourists on an round-the-world basis which entitles them to discounts and other privileges at the resorts.

**WILL TRY AGAIN**—Enderser pilots Bill Stevens and Paul Vlazakis, who set three Lausanne Soar down among some trees when a front engine engine ended their record attempt at Dallas, want to try again next spring.

They were satisfied with the equipment, they said, and would like to use it again. The method of getting up the front engine engine out at the end of a rope, however, was new to them and they want to make condition except for cuts and burns sustained in the forced landing in the dark. They came within 300 ft. of the existing record of 728 hr.

**WHAT PRICE BE-10**—Grosing export demand for BE-105 demand by foreign governments may put the twin eng. super transport up quite a bit on the used plane market. There was a time not long ago when they were close to a "dime a dozen."

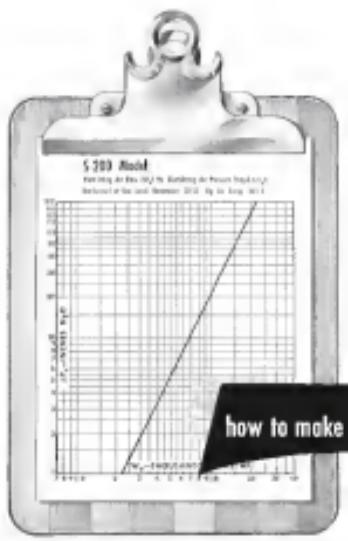
Price of \$300,000 has been quoted in recent advertising for the Vihres bulk tank trailer for export and B E Cases of Case Supply Co., Vernon, Tex., reports that he has recently sold a good used order of BE-105 and spare parts to the Dominican Republic Air Force.

**NICKE LIEK JOE**—Lorraine Airplane Corp. of Dallas, world like to have a distributorship like Joe Potts, aircraft dealer at Hancock Field, Santa Maria, Calif., who recently placed his first order as Lorraine dealer. He asked for 14 new Lockheed, including two four-place Sedans, eight 8A Fins, the low-winged four seater, two Electras, and one each of the Sikorsky Special and Sikorsky De Luxe models.

**RYAN TAKEOFF AND LANDING**—In a recent demonstration Ryan aircraft report a standard Novair, parked at render from the production airplanes as low as Sea Level, took off and cleared a 50 ft. obstacle from a standing start in 930 ft. and approached over a 50 ft. obstacle, landed, and came to a full stop in 875 ft. Tests were with full 2750 lb. gross load, zero wind, at sea level. —ALEXANDER MUSUREY

*The Canadair Four... sets a new standard of operation with the highest performance at the lowest cost of any four-engined aircraft ever developed. On more than nineteen hundred North Atlantic crossings, Trans-Canada Air Lines have proved the outstanding dependability and economy of aircraft designed and built by Canadair Limited.*

**Canadair Limited**  
MONTREAL, CANADA



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Select a heater with low ventilating air flow resistance! Check the above chart. It shows ventilating air pressure drop versus air flow for the Model S-200 Janitrol fan. Heater, fan, add-on to a large, constantly growing line.

Low pressure drop means more air for the same and greater freedom in selection of ductwork shapes, sizes, and lengths. You save weight. You get high performance. In flight, Janitrol heaters use less air, if ground operation is desired, lightweight blowers and smaller heaters serve efficiently and well.

The S-200 fan has an important answer with Janitrol's exclusive whirling blade, it delivers 280,000 cu. ft./hour, yet weighs only 26 pounds and because you can put Janitrol heaters practically anywhere in the aircraft—for practically any heating requirement—your engineer, draftsman, size engineer, pounds all along the line.

Whatever your particular problem—for military or commercial aircraft—call on your nearest Janitrol representative for prompt service. The earlier in preliminary design stage, the better.

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AVIATION WEEK December 13, 1960

4 LOW VENTILATING  
AIR PRESSURE DROP  
COSTS IN A STATE OF RIDICULOUS  
OR UNNECESSARY TYPE REQUIRES  
THE HIGHEST HEATERS.



## AIR TRANSPORT

### Chicago Gets Copier Mail Service

Post Office enthusiasm for project cool because of cost; certification is second of its kind in country.

The nation's second certified helicopter service is to be established in Chicago and major suburban communities within a 50-mile radius of Chicago Midway Airport.

Helicopter Air Service, Inc., Skokie, Ill., was chosen in the Civil Aeronautics Board to conduct the certification trial and generate revenue for the 10-year Air Mail option of Airline Air Services, Midway, Ill., to operate the service via

► Larger Than Los Angeles System—Certification of HAS for a 305-mile option in the Chicago area followed in about 15 months of constant refurbishment to Los Angeles Airline, USA, which started service on Oct. 1, 1947, has in these four years, certificate for an approximately 200-mile radius within the Los Angeles metropolitan area.

CAB established helicopter service in Chicago during 1957, and the Post Office Department's enthusiasm for the project helped its cost. The Board's decision complicated that further development of the helicopter and the expectation to be gained from helicopter operation provide the extent of its trial effects.

► Military Support Globally—The Air Force and the Navy staged certification of the Chicago system. They said the operation would build a structure of broad heliports, highly automated and engineering potential, most of which would be available for defense.

The Chicago helicopter service will expand and operate from 6 to 20 hr in weekdays and by 40 to 42 hr. on weekends and public-holiday periods. As the second largest city in the United States, Chicago is also the second largest guardian of air mail.

► Route Test—The three routes in Illinois to CAB are under study and terminating at Chicago Municipal Airport.

Segment A includes Bensenville, Dolton, Forest Park, Glenview, Evanston, Winnetka, Wilmette, Glencoe, Highland Park, Park Ridge, Skokie, Woodlawn, Lincolnwood, Skokie, Bellwood, Bellwood Heights, and Forest Park. Segment B includes Elmhurst, Villa Park, Glenview, Wilmette, West Chicago, Elgin, St. Charles, Geneva, Itasca, Winona, Naper

► Post Office Notes Study—CAB last session deferred discussion on the Chicago helicopter route for 60 days to give the Post Office time to consider the impact of the service on the Midway surface mail transportation system. A subsequent report indicated that new government aerial trade could perform a service "approximately equal" to the helicopter operation at an annual overall cost of \$74,600.

► Bell Notes—Bell found that considerations of local outcome reflect public usage of the service. Bell believes, service expense could have double the revenue implications. The operator should obtain an air transportation subsidy with awards to the safety and efficiency of a relatively new type of aircraft in scheduled commercial service, the Board declared.

The recent war and the present trend of events demonstrate that it is of considerable public interest that new types of scheduled air transportation be initiated when circumstances permit a reasonable expectation of success. In many respects military and commercial fields of air transportation are very similar in nature. Versions of the helicopter are similar to commercial types.

### PAA Sells Flying 307s

Three Boeing 367 Stratotankers retired from active service 18 months ago have been sold to Airline Training, Inc., Hemet, Calif., for use in four-engine flight training of pilots, engineers and flight crews.



### LOS ANGELES AIR SHOW

► TWA and other major plane operators were invited on Nov. 20, 1960, to Los Angeles Air Transport Day at Los Angeles Airport. Last month, TWA had a top-notch of "flying letters." About 50 percent of the passengers using transoceanic flights were first-timers, and some of them planned to use the aircraft as the basis of a start of their short trips. TWA's Constellations made 10 flights during the day carrying 900 passengers at \$2.50 each. All flights were overcast, and visibility, enforcement was limited, so Westair, Air Los Angeles made DC-4 trips with 264 passengers. Together with American Airlines, TWA and Western are making the 1961 logo a regular feature of the Los Angeles. Passenger shows a W.M. Conroy's Los Angeles International, a Los Angeles Airport Islands, TWA's helicopter (large helicopter) and two TWA Constellations and an American DC-4 in the back ground.

AVIATION WEEK December 13, 1960

TRANSPORT

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## EDITORIAL

### Individualism Can Be Too Rugged

It is difficult to see how much longer the individualistic members of the Air Transport Association can afford to go their separate ways ignoring so many opportunities for joint economies.

The singular lack of standardization was brought home recently to a group of traveling executives in towns through the Midwest and Boeing plants. Of course, transport manufacturers have wrangled frequently on the subject for years and are able to relate scores of individual changes each carrier demands.

Some, of course, are important and necessary. But when thousands of dollars are spent in labor and materials for such special items as different models of air bags—or putting passengers down on the left instead of the right—one doubts those professional contractors employed by the lines have not moved far enough from their office desks.

First Oldham, chairman of the board of Copeair, said the other day in San Diego that to date no average of

### Wichita—Bright Spot in Aviation

A tour of every major aircraft plant west of St. Louis reveals that Wichita is the brightest city in the industry.

In no other aircraft center are all of the manufacturers so busy, so healthy. Essentially, Wichita is proud of productivity and quality of its labor, as it has a right to be. And there are no labor shortages as yet.

Each of the three major companies enjoys intelligent and efficient management that excels in ingenuity and enterprise. Optimism is apparent everywhere.

A sleek building and pilot space Boeing's two plants under Earl Shapus, vice president, lead the city. As pointed out in AVIATION WEEK Nov. 22, big programs are the B-52 modification line, reworking of B-50s, production of assemblies for four big Boeing models, as well as space parts and launch vehicles. The B-47 line is being prepared. Last March Plant 2 was occupied by sparsors. Today, in a miraculous transformation, it is filled with B-52s and B-50s. In addition to its goal of 15,000 employees in Wichita, Boeing subcontracting will benefit companies from Omaha to Ft. Worth.

At Beech, Inc., the tempo is quick. Production is kept non-existent by enthusiasm. Production and Navy model aircraft already sold in AVIATION WEEK Nov. 22, 23, are being supplemented by several experimental projects including the two Twin Quad Transport and the Bonanza with two Franklin engines. In addition to one

\$75,000 per Convar sold has been spent by the unindred value customers on their own peculiar modifications. Beech officials told of even higher costs for the bigger Stratocruiser.

Another higher, hidden cost of such modifications is in the time lost to the airlines in obtaining delivery.

Mr. Oldham's plan—on a similar idea—for housing transports off the shelf for a fixed price is a big step in the right direction.

Certainly, the next six months or year must see the biggest cost cutting progress in the history of the nation's airlines—especially among the larger carriers. It will be fortunate, indeed, if one or two companies are spared serious financial difficulties in the first half of 1949.

The ATA has a golden opportunity to work together for economy but so far there is insufficient evidence to indicate top management realizes it. Frankly, we prefer to see management running the airlines, instead of the bankers.

General Manager Jack Gary has another idea that may hit the headlines before long, which would greatly increase the range of larger aircraft and make them more appealing to airline passengers. Beech has built over 127 twin engined planes and 277 monoplanes since the war. They are flying in 32 other countries besides the U.S.

Genoa's President Dwight Wallace and Don Flavell, sales manager, suspend the visiting writers with their strong faith in the personal aircraft future, but feel there is a tremendous selling job that must be done by themselves as well as the industry.

Flaver is convinced that personal or executive aircraft sales will rise in airline passenger income, as the theory that those who are sold on commercial air travel will be quick to see the advantages of operating their own executive planes. In an industry that had to take off in improvements in aircraft design work immediately after the war, Cessna succeeds with two profitable side lines. It is producing hydraulic parts for Army implements for Johns Deere, J. I. Case and Moline, and it is turning out hundreds of tropical and aluminum and wood cladding, louvered, tables and other fixtures for the Quartermaster Corps. Aircraft production will continue throughout the winter. No one is singing the blues in Wichita.

ROBERT H. WOOD

# Bendix Products

## AIRCRAFT FUEL METERING SYSTEMS



### BENDIX FUEL METERING CONTROLS

Performance-Proven on Leading Jets

In two years of single use, Bendix Fuel Metering Controls have set a remarkable record for efficient, reliable, and dependable operation. Today they are continuing to set the pace on such planes as the F-84, the F-100, and the F-105. **Efficiency:** New use of ultradope compensation provides a fuel economy of 10% to 15% over previous air-fuel ratios and improvements for acceleration.

**Reliability:** Work equally well with gasoline or kerosene...With or without water injection...Adaptable to various aircraft needs...Can be modified to handle large tonnages...Dependability: A record of dependability beyond all expectations—comparable to that of other Bendix Fuel Metering Equipment over the years.

### BENDIX PRODUCTS

DIVISION of



SOUTH BEND 25, INDIANA



## SETTING THE PACE IN JET PROPULSION....

### Westinghouse Turbojet Engines

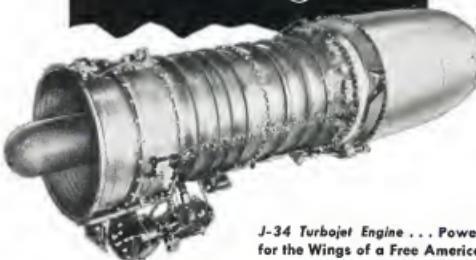
In the field of jet propulsion, Westinghouse leadership is setting the pace. Axial-flow Turbojet Engines . . . pioneered in the U. S. A. by Westinghouse . . . contribute immeasurably to the sleek design, light weight and unprecedented power that characterizes advanced aircraft.

Every engine embodies over 50 years of Westinghouse experience in building high-speed rotating machinery . . . complete dependability is assured. Ease of installation, maintenance and replacement are achieved by sectional assembly and simplicity of design.

Proud though Westinghouse is of its contribution to America's supremacy in the air, it is by no means content to rest upon the laurels of past achievement. Its extensive laboratories, devoted exclusively to the development and refinement of aviation gas turbines, are earnestly pressing forward the exploration of new frontiers in aircraft engine design . . . that this supremacy may be advanced to heights yet unattained.

J-50494

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